

FIG. 1A

FIG. 1B

FIG. 1C

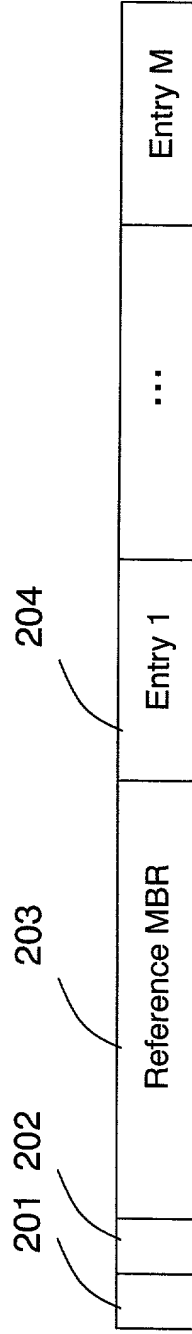


FIG. 2A

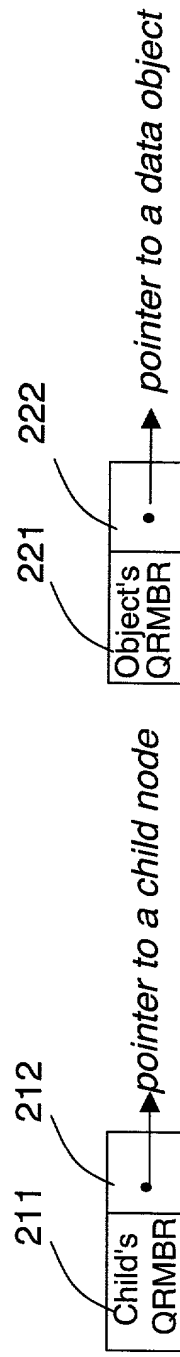


FIG. 2B

FIG. 2C

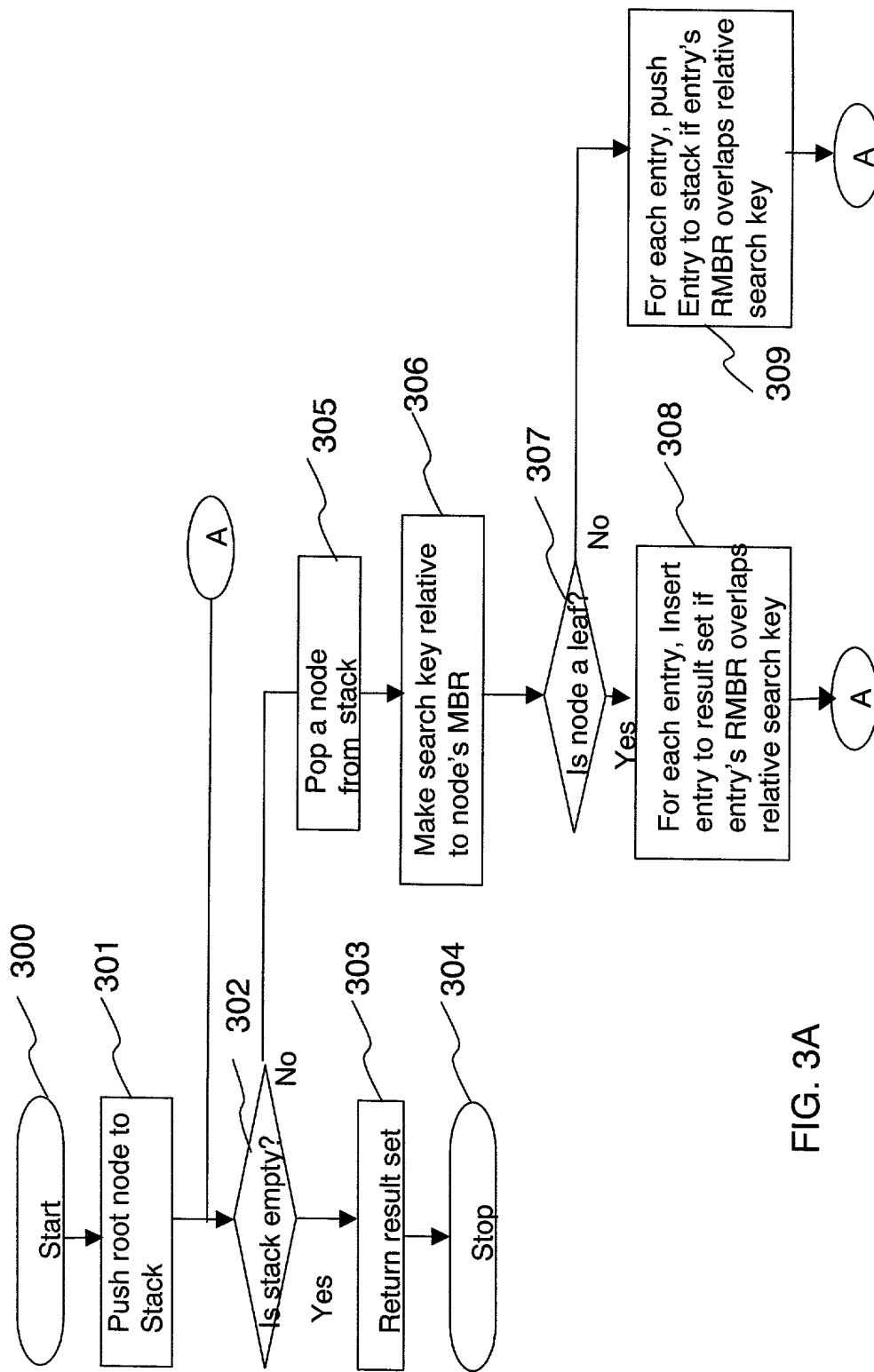
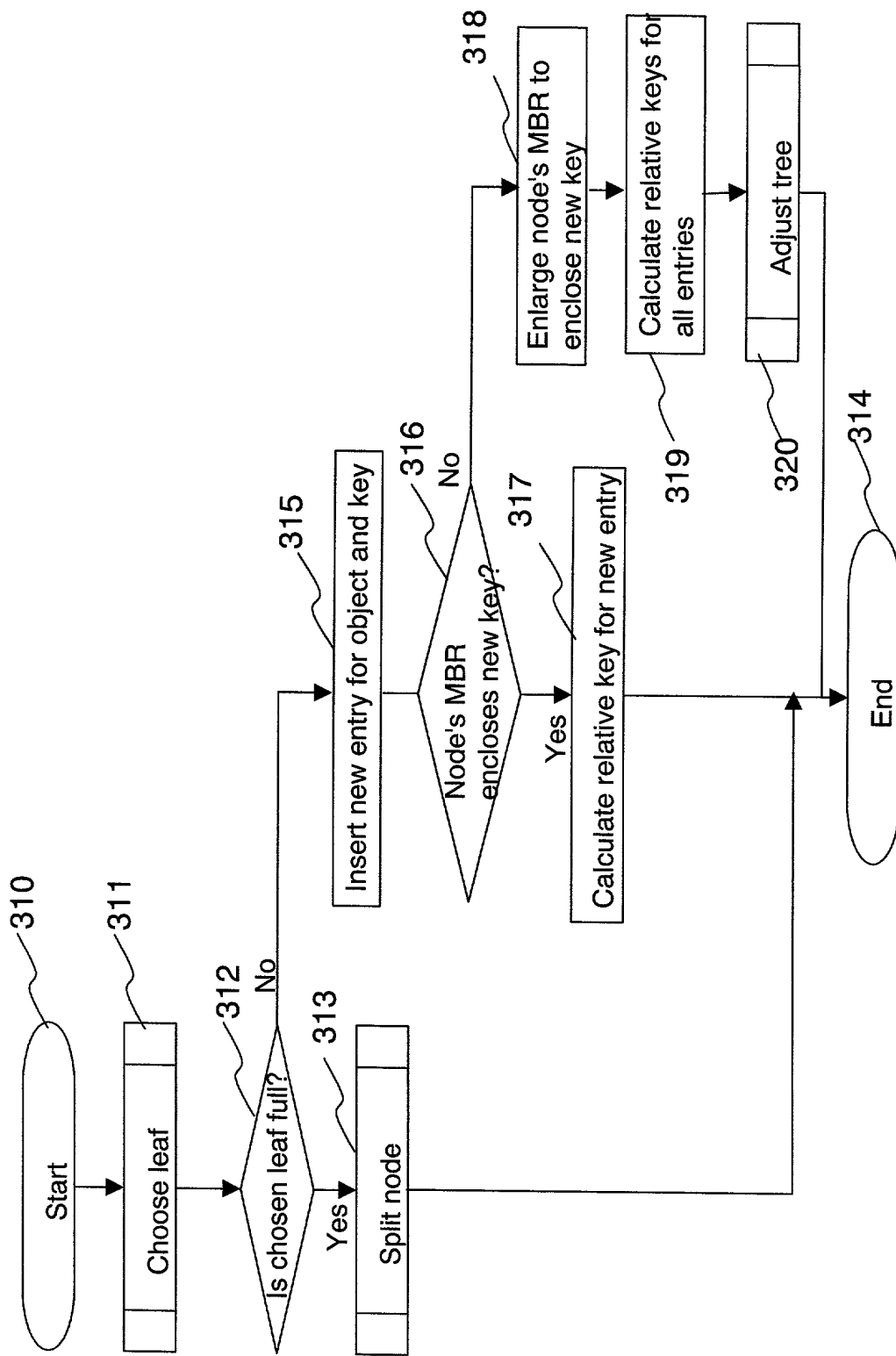


FIG. 3A



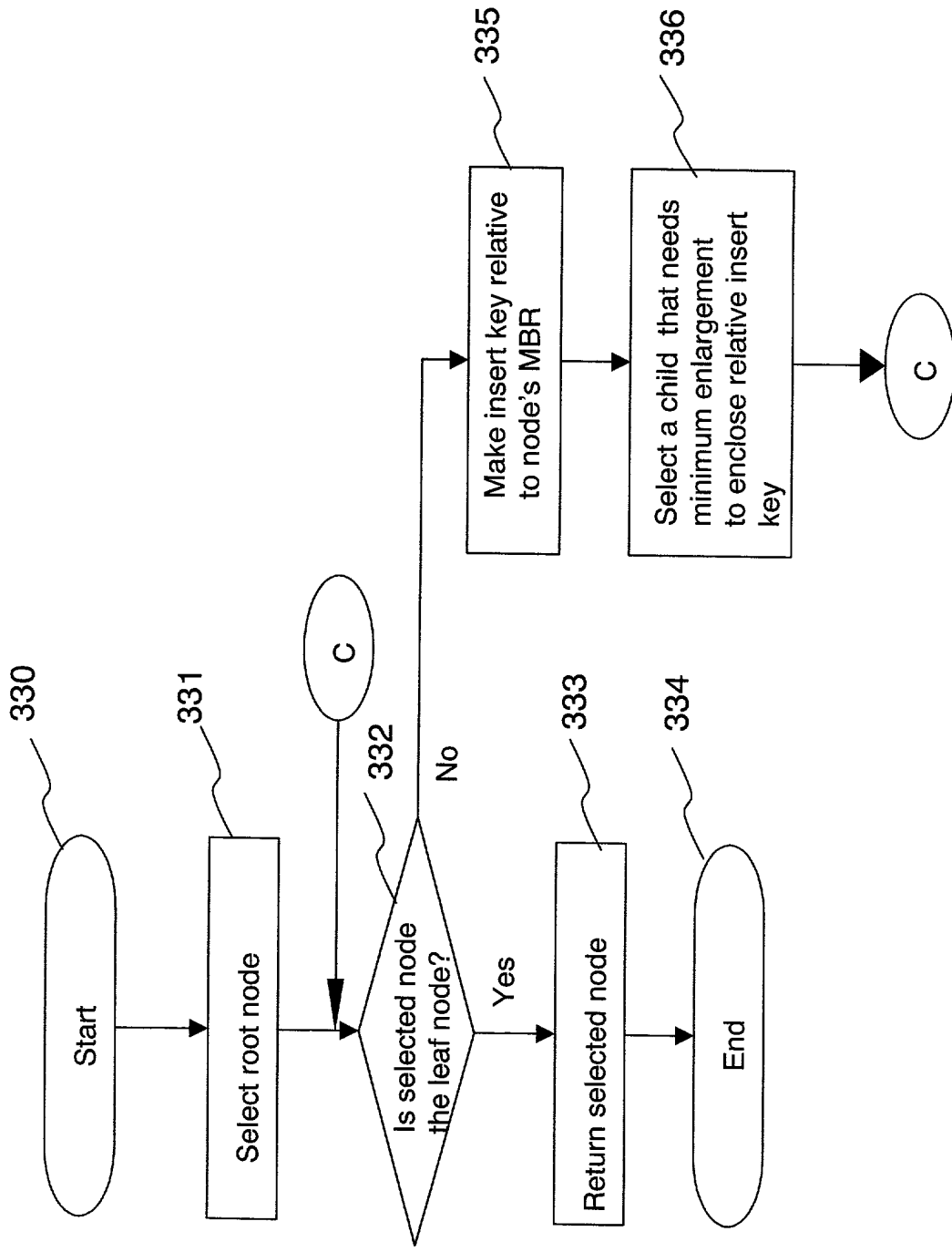
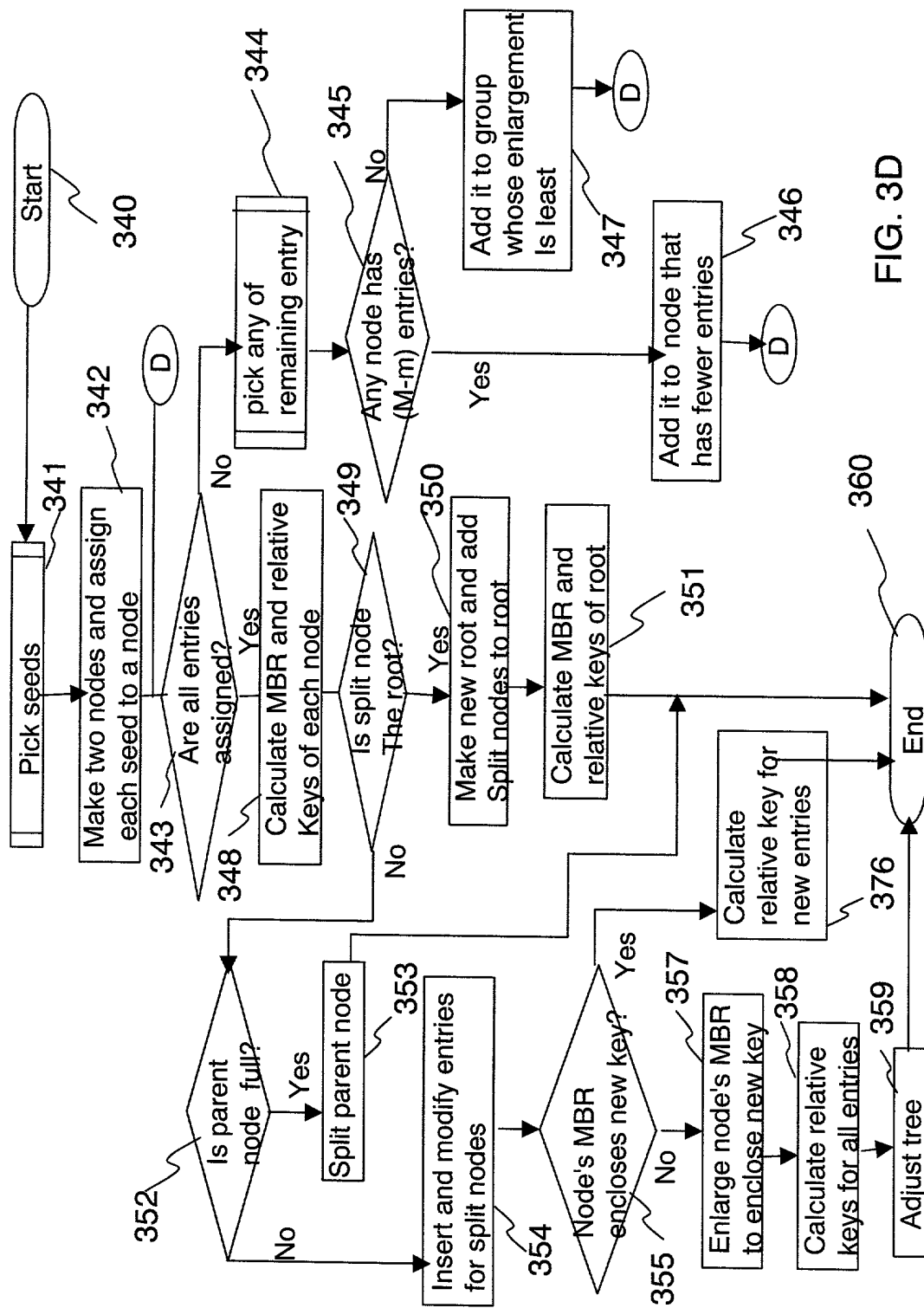


FIG. 3C



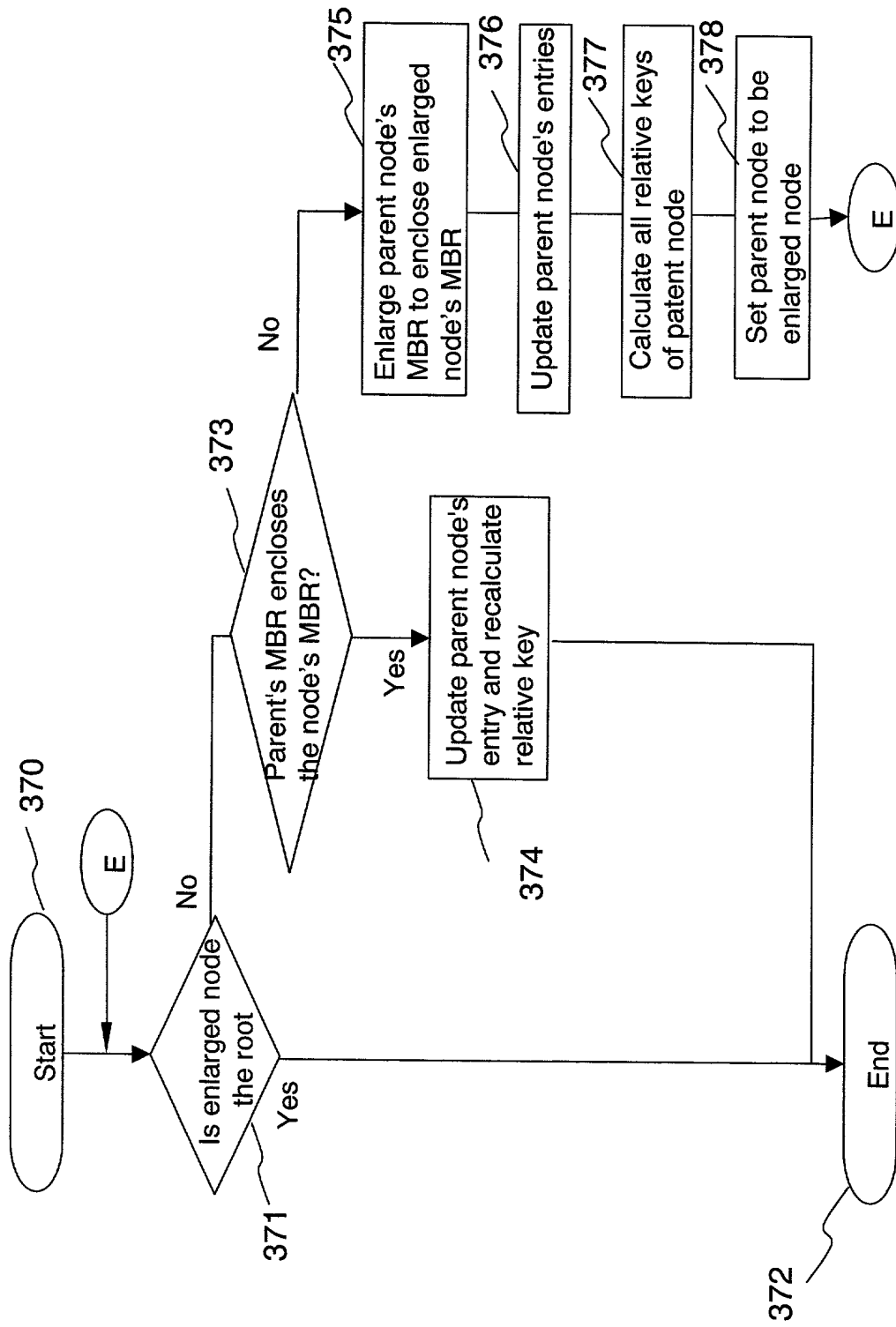


FIG. 3E

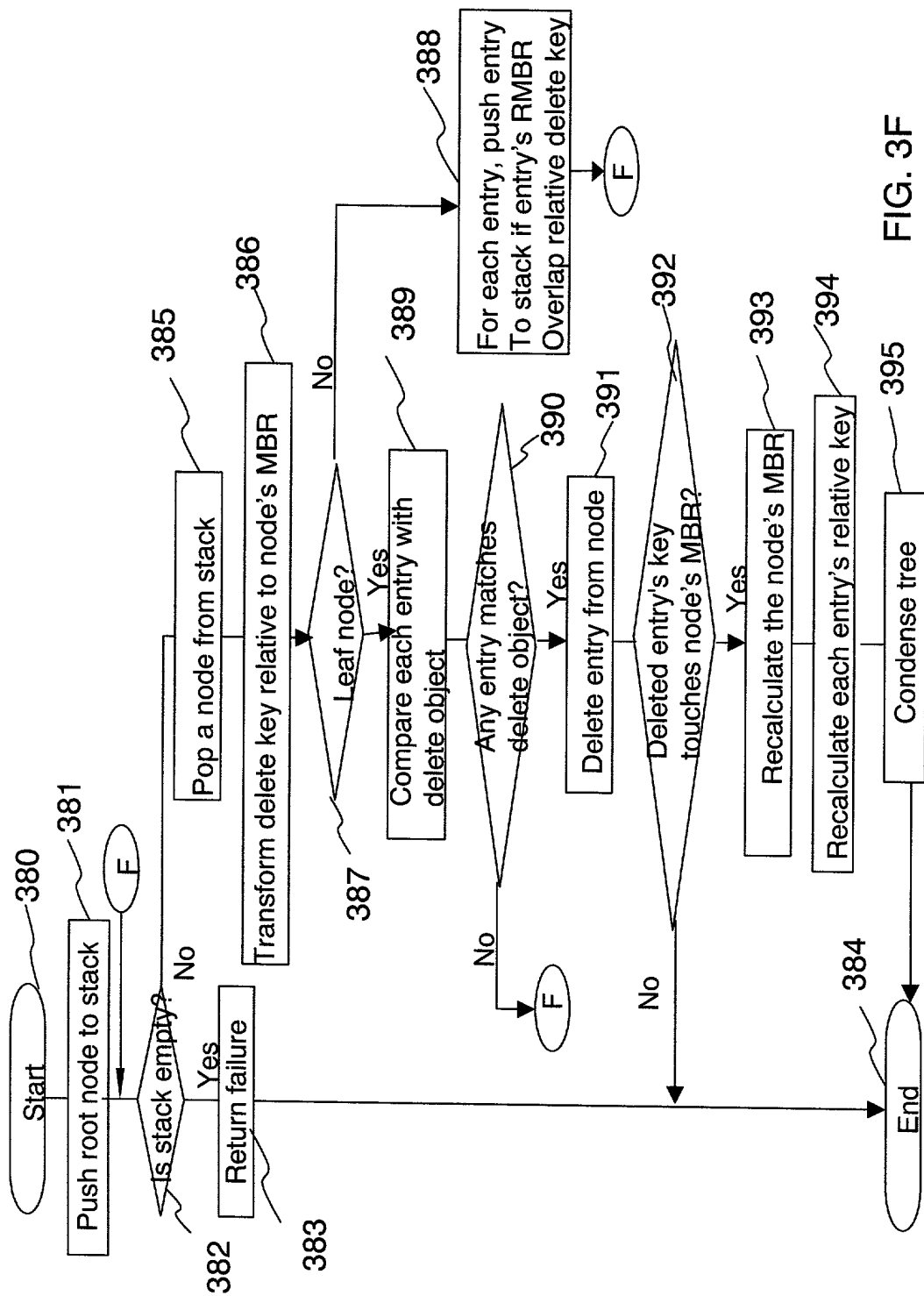


FIG. 3F



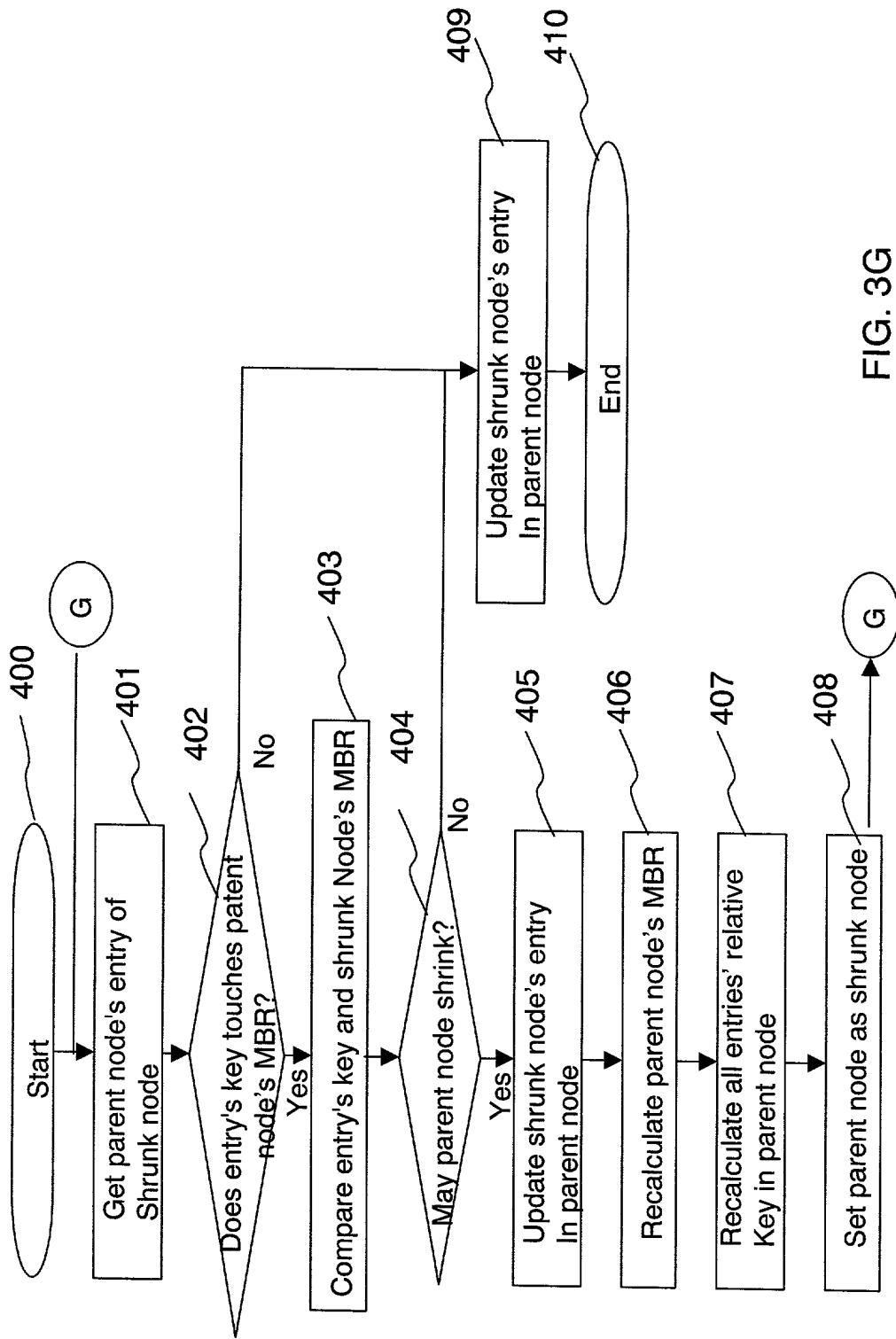


FIG. 3G

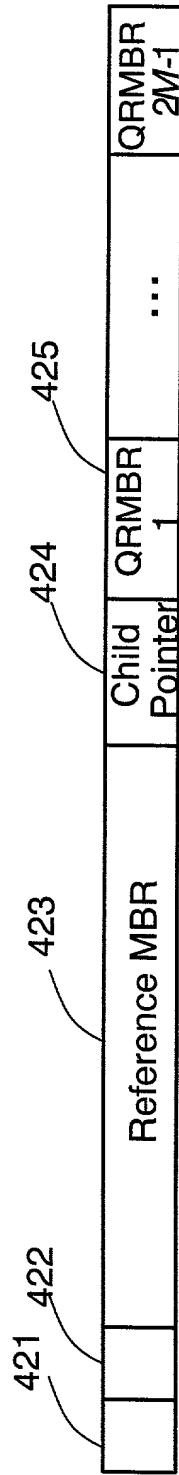


FIG. 4A

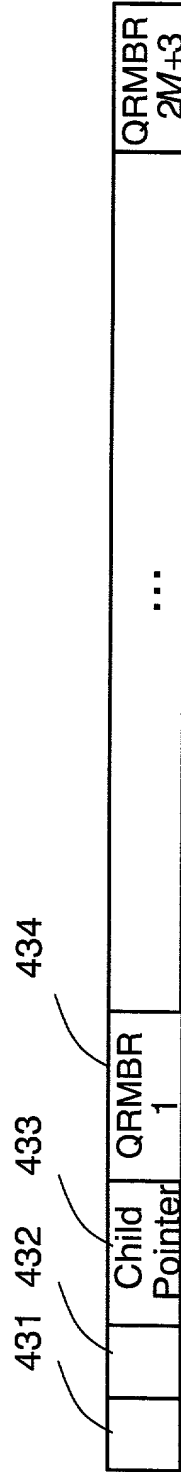


FIG. 4B

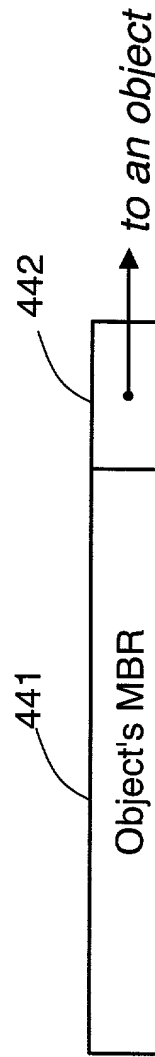


FIG. 4C

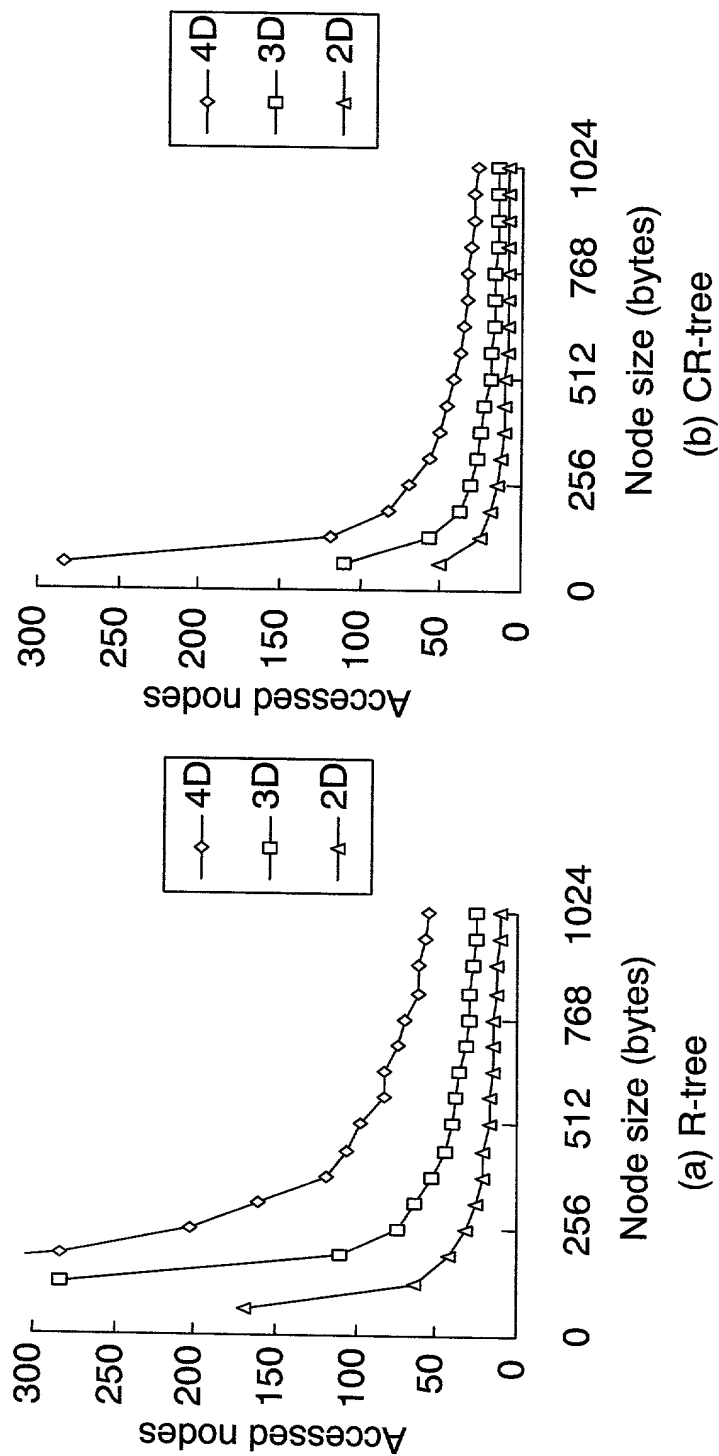


FIG. 5A

FIG. 5B

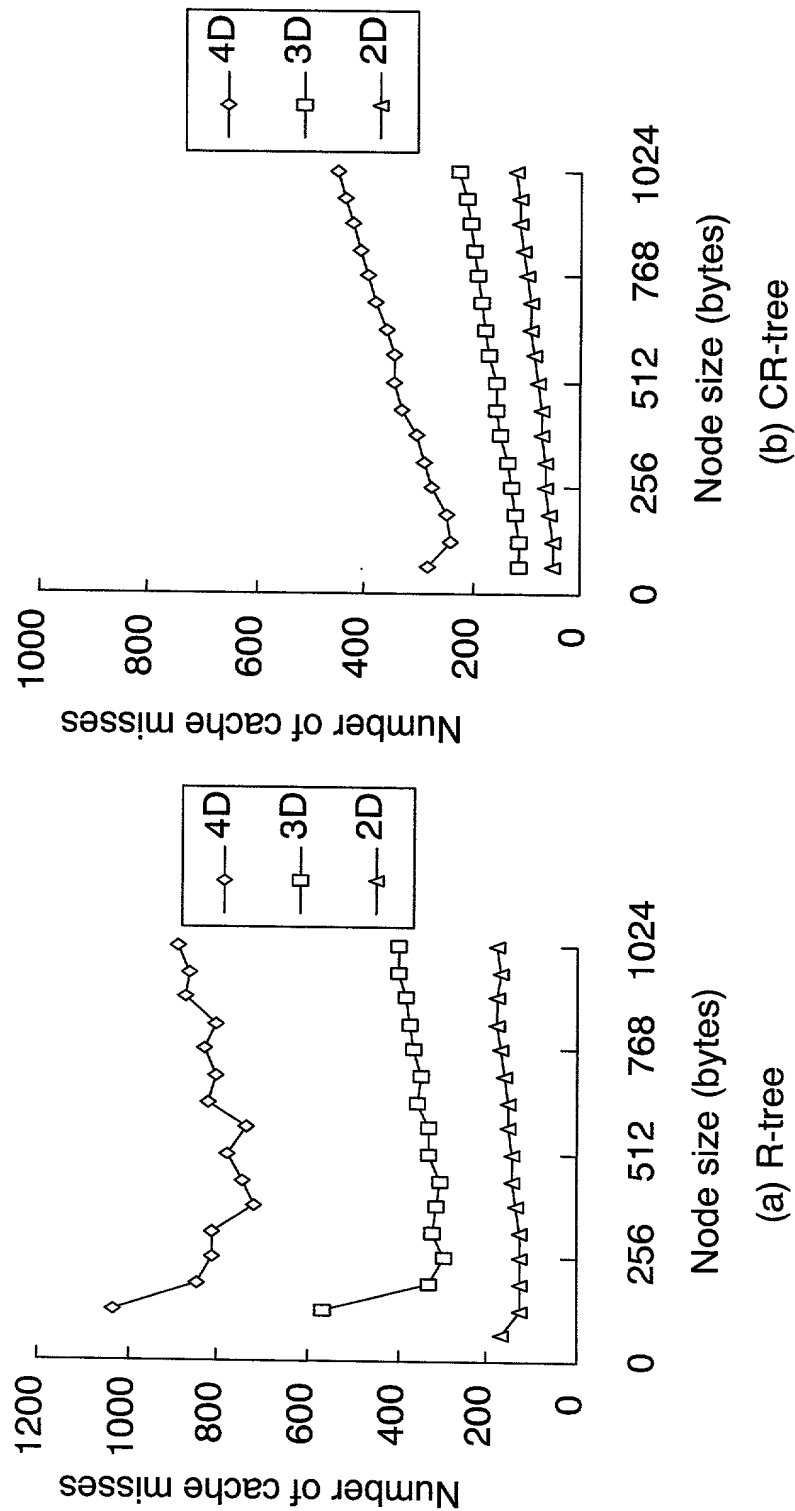


FIG. 6A

FIG. 6B

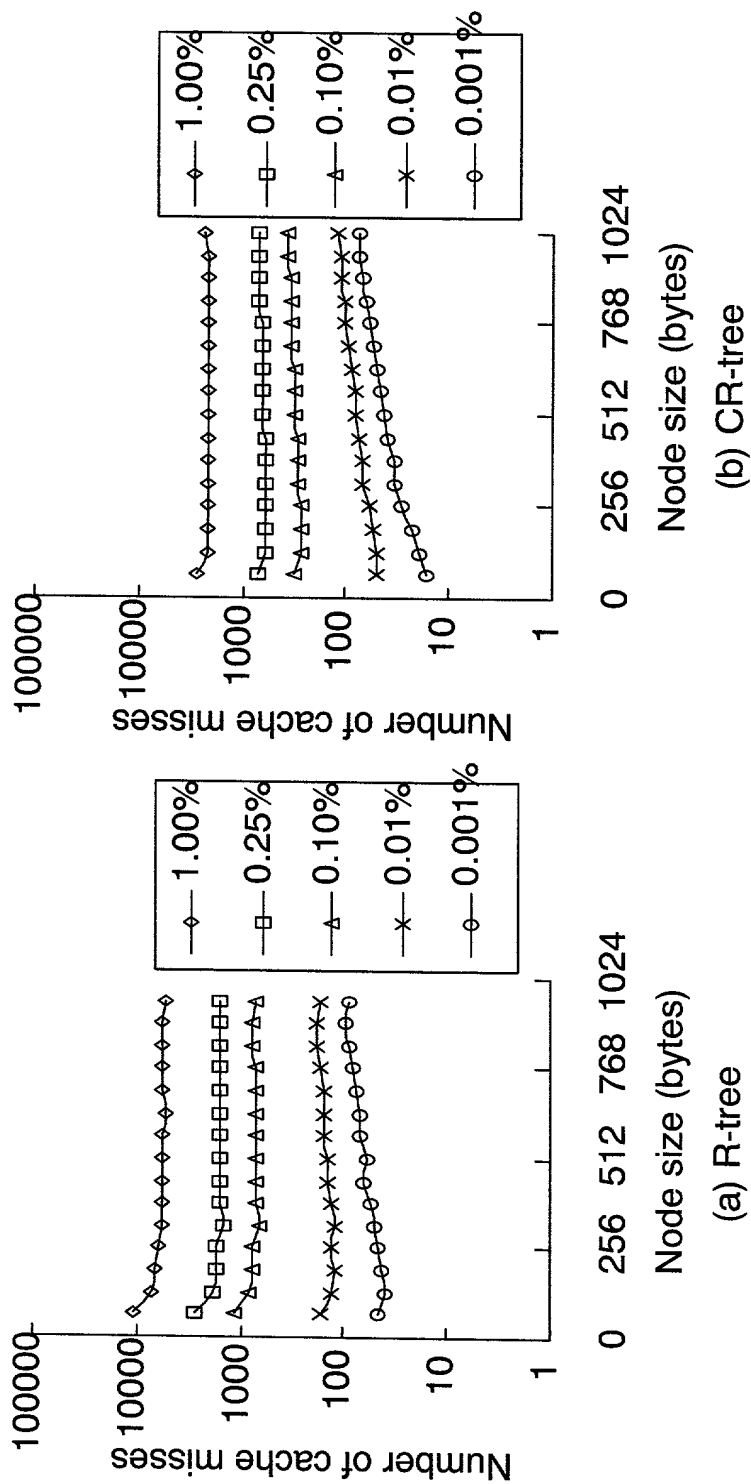


FIG. 7A

FIG. 7B

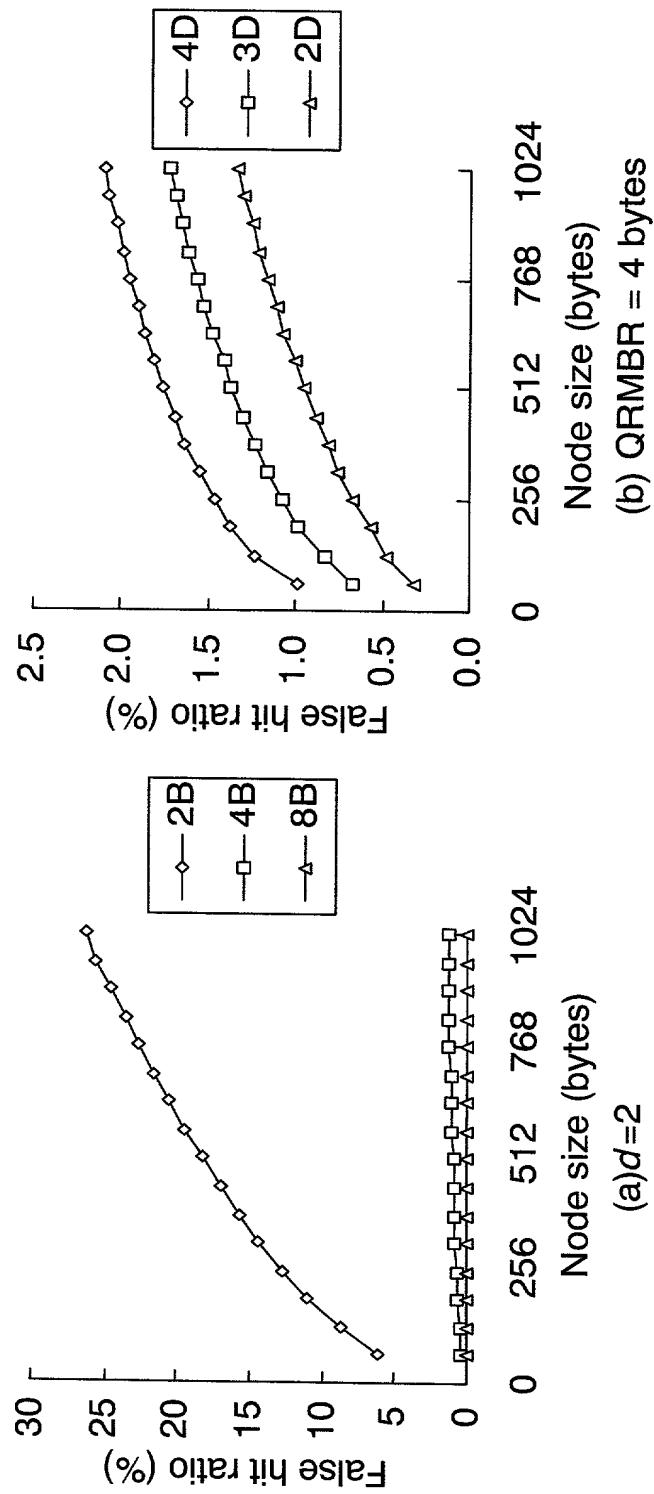


FIG. 8A

FIG. 8B

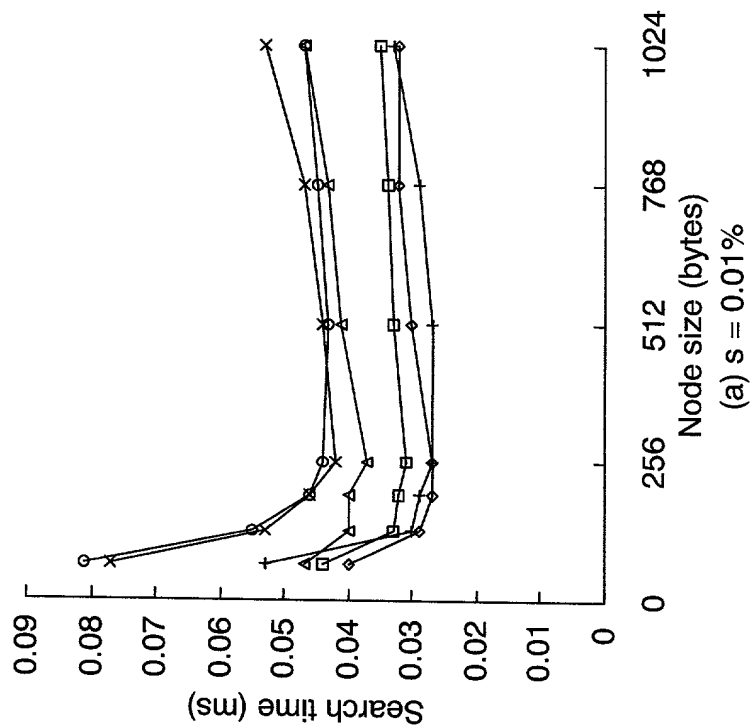


FIG. 9A

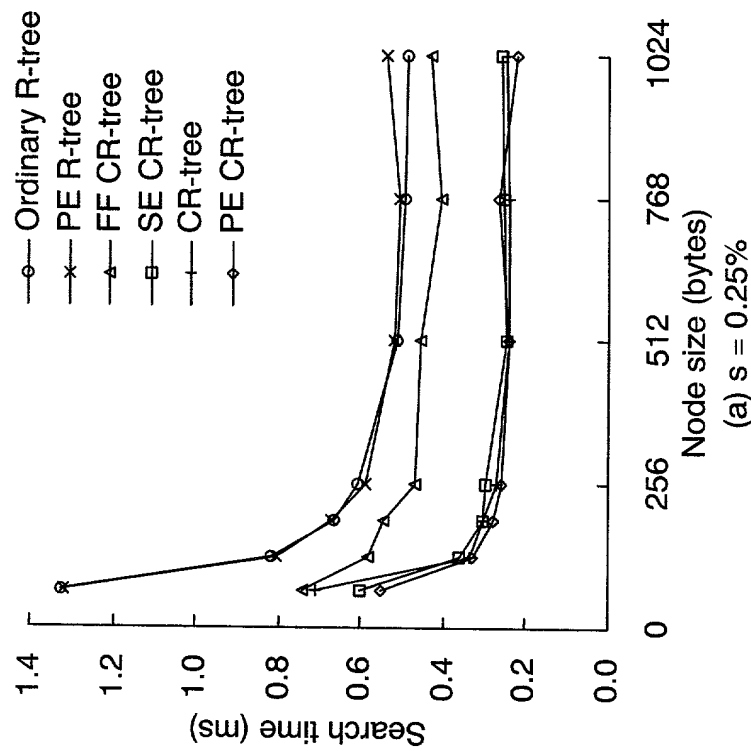


FIG. 9B

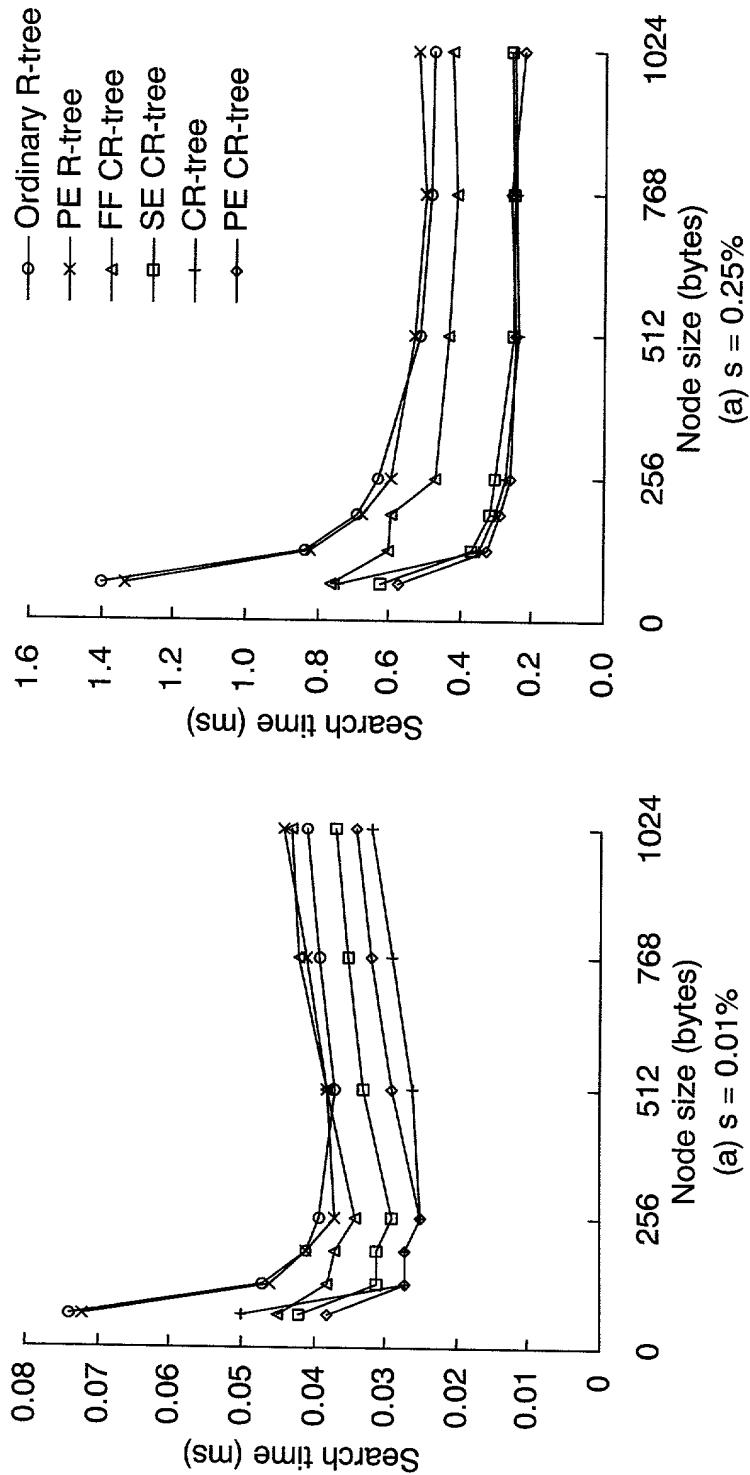
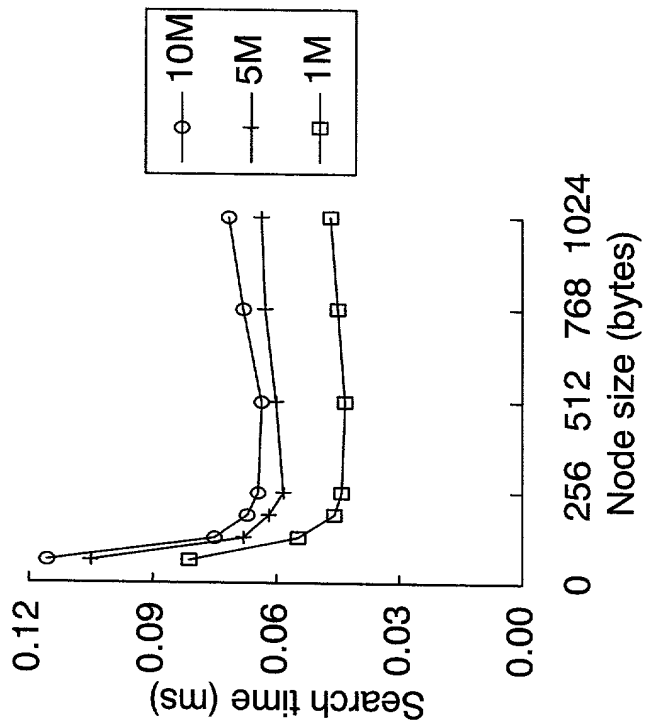


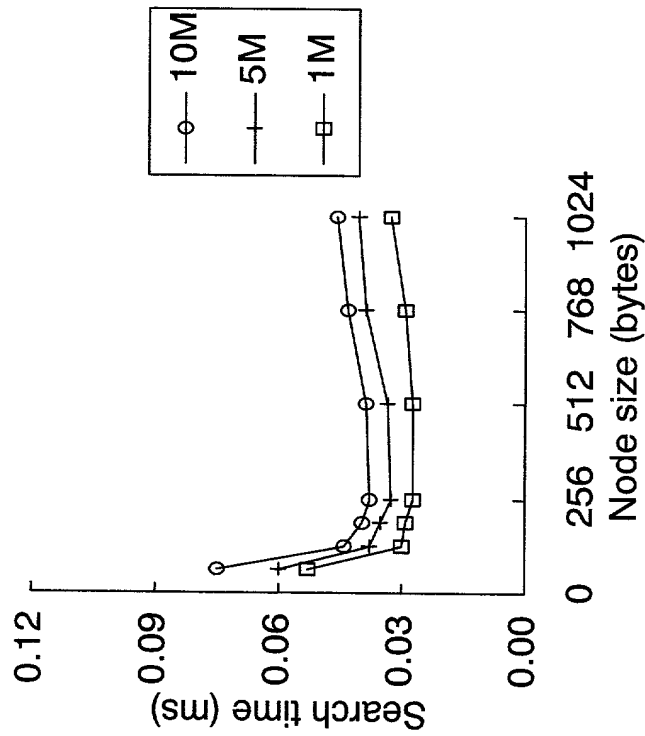
FIG. 10A

FIG. 10B





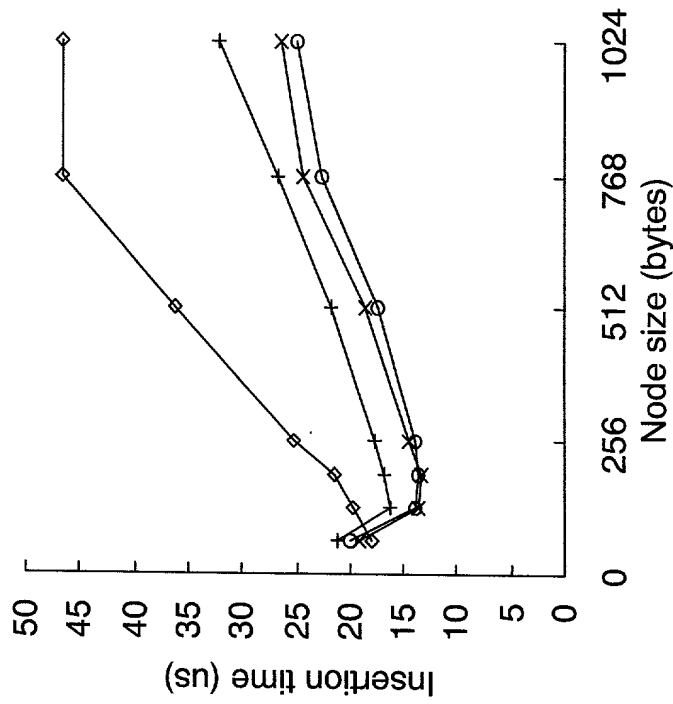
(a) R-tree



(b) CR-tree

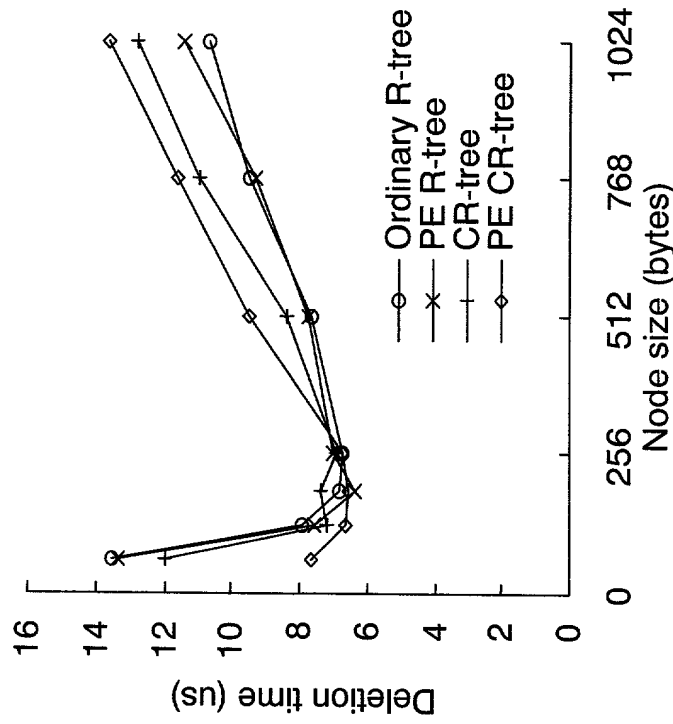
FIG. 11A

FIG. 11B



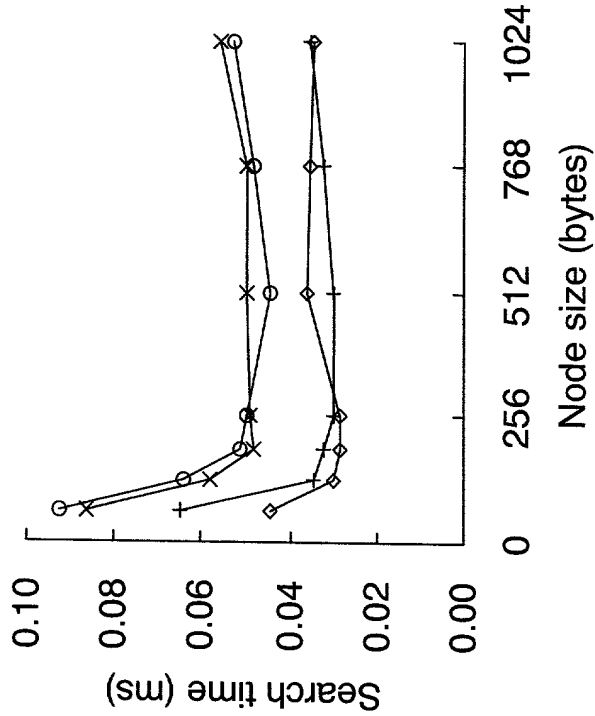
(a) Insertion Time

FIG. 12A



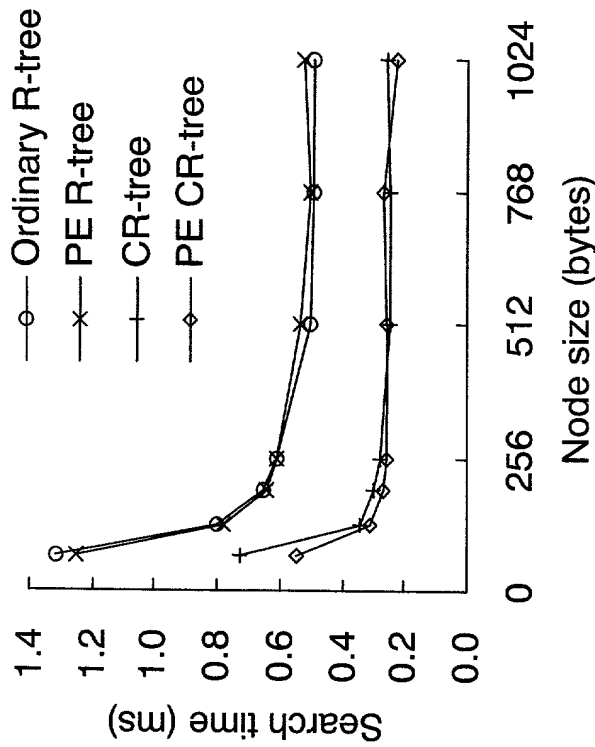
(b) Deletion Time

FIG. 12B



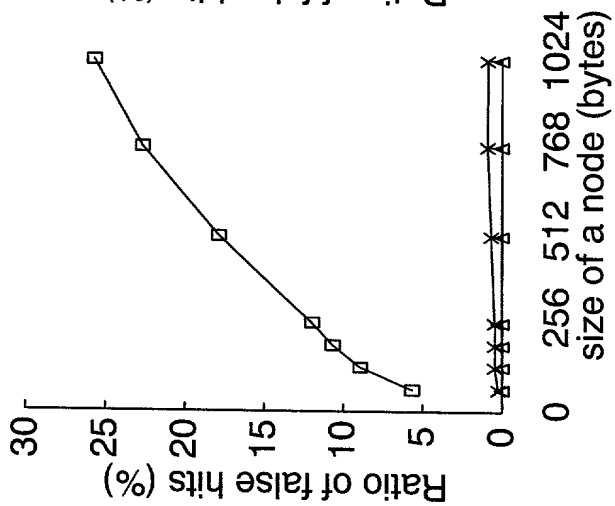
(a) Selectivity = 0.01%

FIG. 13A

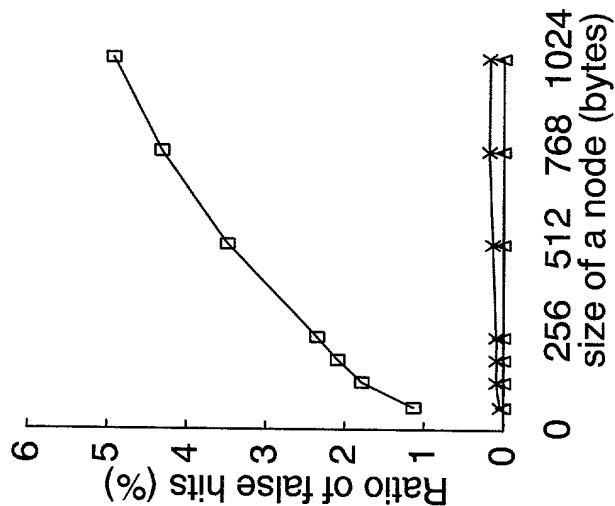


(b) Selectivity = 0.25%

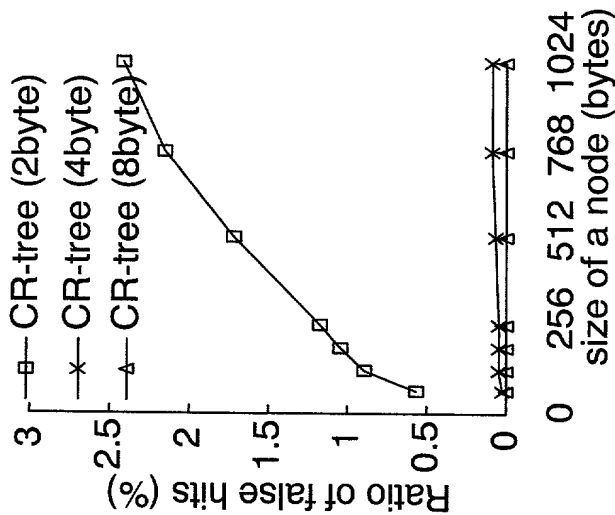
FIG. 13B



(a) Selectivity = 0.01%



(b) Selectivity = 0.25%

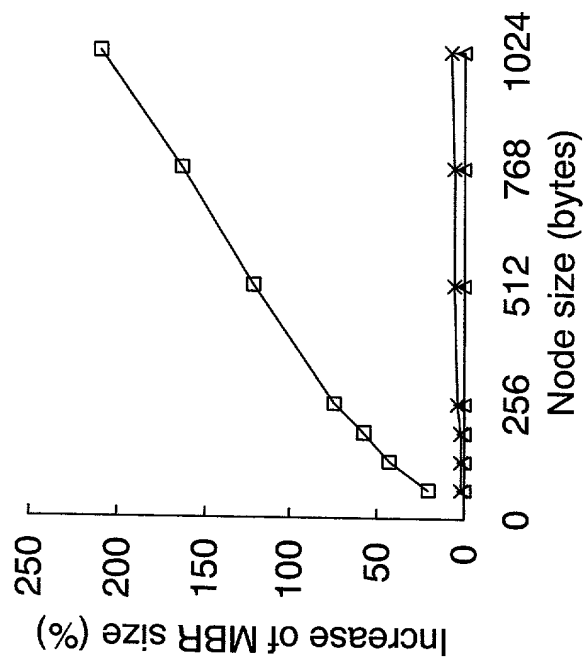


(c) Selectivity = 1.00%

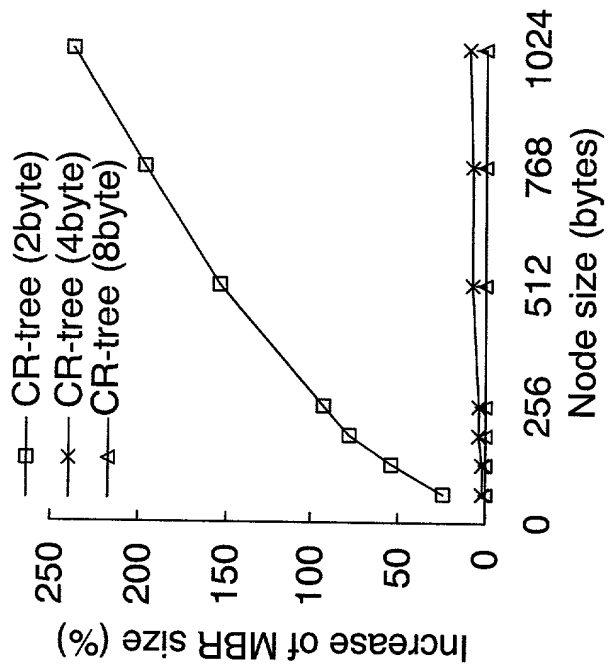
FIG. 14A

FIG. 14B

FIG. 14C



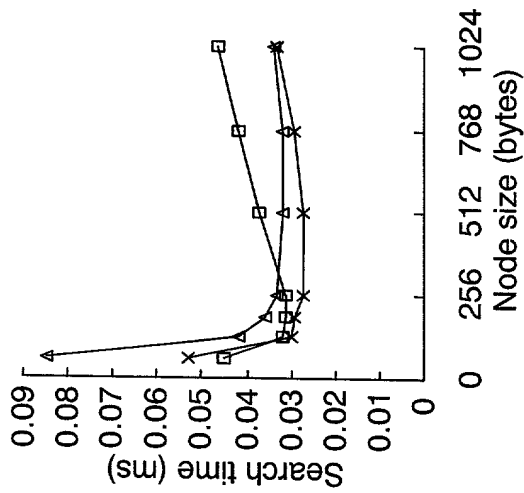
(a) Object MBRs



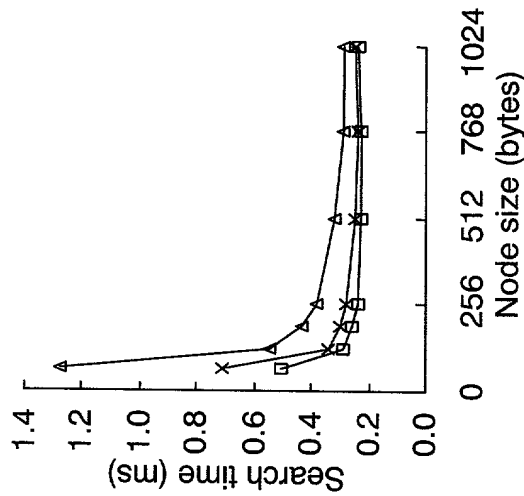
(b) Node MBRs

FIG. 15A

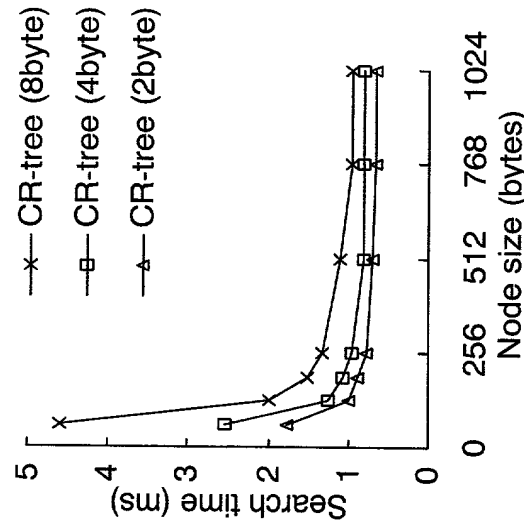
FIG. 15B



(a) Selectivity = 0.01%



(b) Selectivity = 0.25%



(c) Selectivity = 1.00%

FIG. 16A

FIG. 16B

FIG. 16C

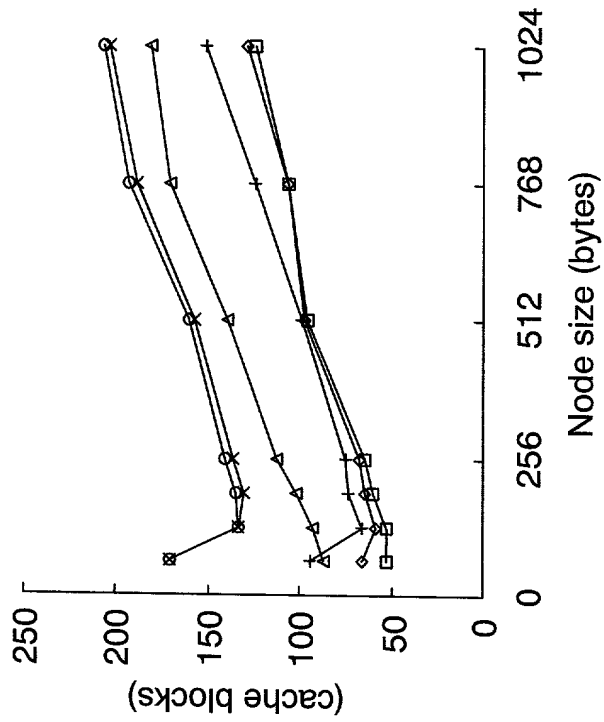


FIG. 17A

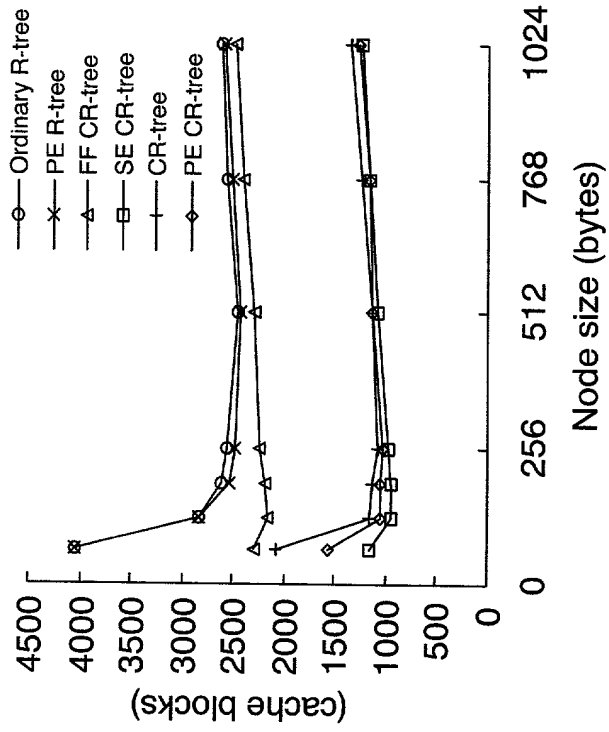
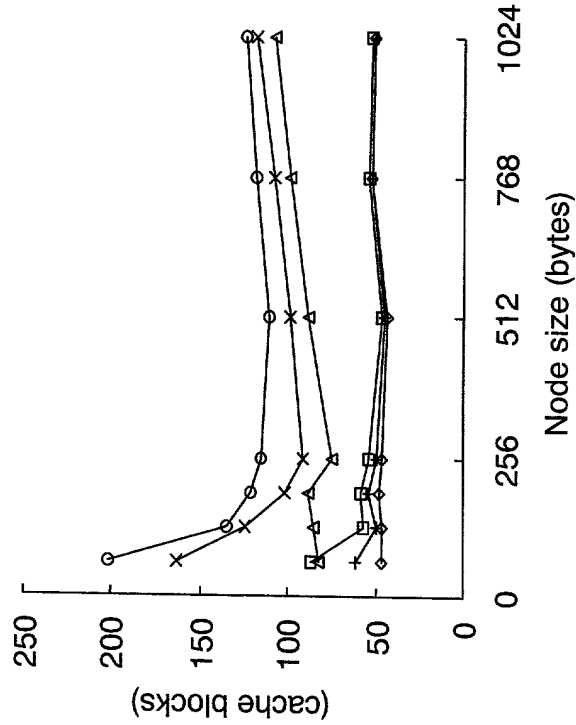
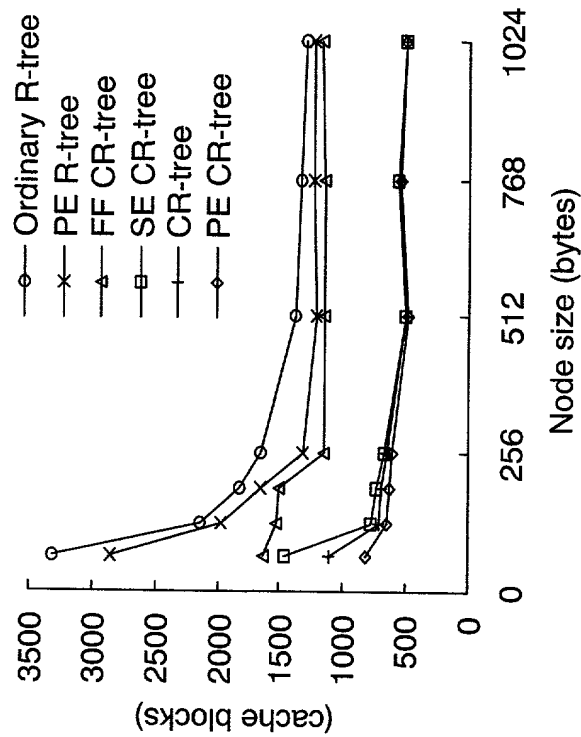


FIG. 17B



(a) Selectivity = 0.01%

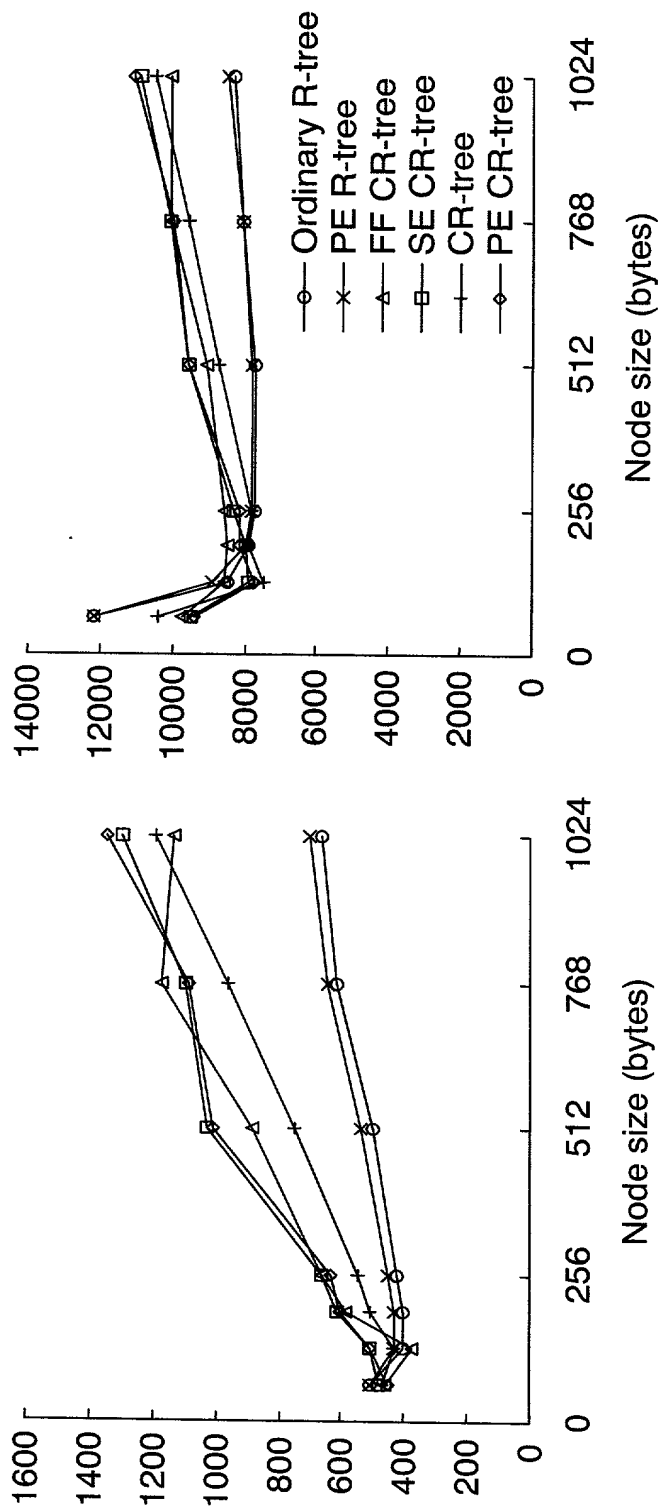


(b) Selectivity = 0.25%

FIG. 18A

FIG. 18B



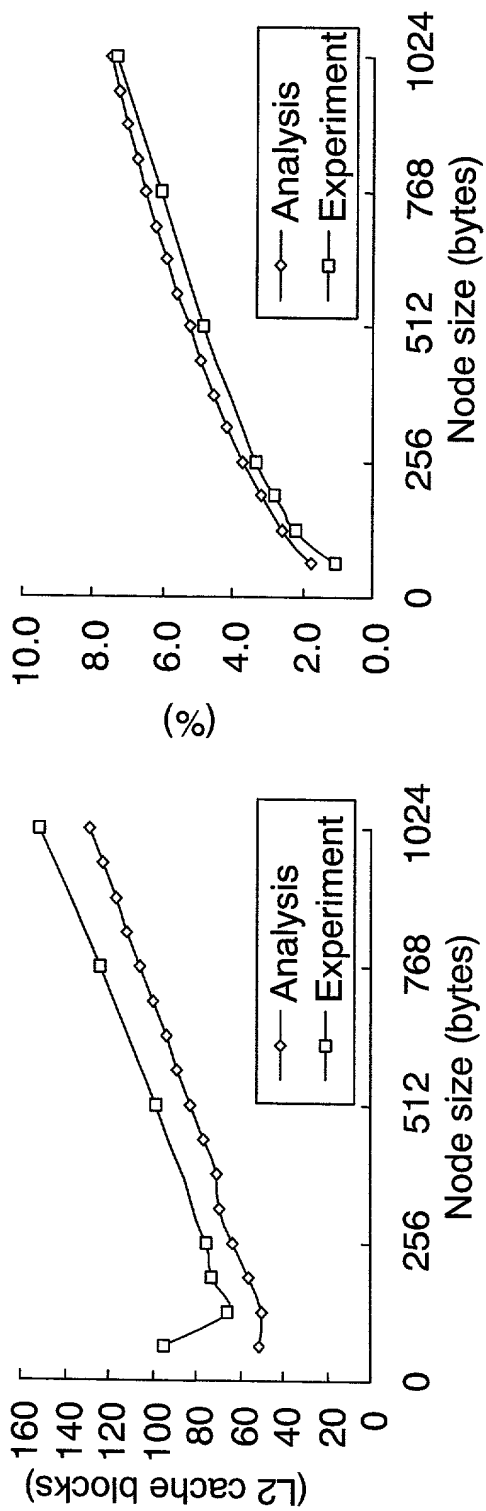


(a) Selectivity = 0.01%

(b) Selectivity = 0.25%

FIG. 19A

FIG. 19B



(a) Amount of Accessed Index Data

(b) Increase of Object MBR Size

FIG. 20A

FIG. 20B